

REMARKS/ARGUMENTS

Claims 1-30 are active in this case.

The amendments to claim 1 and claim 11 is found throughout the specification, e.g., at page 1, lines 30-35, page 2, lines 21-25 and page 3, lines 30-33.

Also, as claim 1 has been amended the alleged redundancy that is noted on page 3 between claim 10 and claim 30 is no longer applicable.

The specification is amended to correct the noted typographical errors and to provide a new Abstract. A substitute Declaration and Supplemental Application data sheet are also filed here to correct the noted error in the first set of papers filed.

No new matter is believed to have been added by the submission of these amendments.

The claims are directed to the selection of particular compositions that are useful for the detection of neutrons. Indeed, the specification (pages 4-5) provides data demonstrating particular advantages of the material compared to other scintillating materials known. In particular, the advantages when there was a change from Cl to Br and the molar % of Ce was increased should be noted (compare 2 to 3-5 in Table 1 on page 4-reproduced below for reference).

TABLE 1

Comparative properties of Cs ₂ LiYBr ₆ :Ce ³⁺ and other neutron scintillators.				
Compound	Light Yield (photons/ neutron)	Energy resolution to neutrons (%)	Pulse Height Discrimination F _y	Decay Time (μs) Under gammas/ neutrons
1 Cs ₂ LiYCl ₆	34000	14.5	0.61	7.0
2 Cs ₂ LiYCl ₆ :0.1% Ce	70000	5.5	0.66	6.5
3 Cs ₂ LiYBr ₆ :1% Ce	85800/88200	4.5/9.0*	0.76/0.75	0.089
4 Cs ₂ LiYBr ₆ :0.3% Ce	73 000	—	—	0.070/0.0083
5 Rb ₂ LiYBr ₆ :0.5% Ce	65 000	—	—	—
6 LiF—ZnS:Ag	160 000	—	0.45	1
7 LiI:Eu	51 000	40	0.86	1.2
8 Li glass	6 000	13-22	0.31	0.075

(*Double-peak structure in spectrum for sample)

(0.1% Ce signifies x = 0.001 in the generic formula which is in fact Cs₂LiY_{0.999}Ce_{0.001}X₆.)

In the Official Action, the Examiner has rejected the claims as being obvious in view of the publication of van Loef et al. This publication is also cited and discussed in the specification on page 3, lines 23-28. The van Loef et al publication does describe similar materials to those defined in the claims (see page 8482, 1st paragraph and page 8484, sec. 3.1 of van Loef et al). The van Loef et al publication, however, does not describe the use of these materials as neutron detectors (see also page 3, lines 26-27 of the present specification). This fact has been noted by the Examiner (see, e.g., page 4 of the Action) but because there was no requirement for neutron detection, the rejection was applied. While the inclusion of “neutron detector” in original claim 1 should have been sufficient, claim 1 has been clarified to provide the detector which detects luminescence emitted from the scintillating material as a measure of the presence of neutrons in a radiation sample applied to the neutron detector. Therefore, any remaining doubt as to the differences should no longer persist.

The method claims (11-20) in which the material is used to detect neutrons have also been rejected because an active step requiring the detection of neutrons is not provided, i.e., “using a material . . .” is not a sufficient limitation. As apparent from the amendments submitted, Claim 11 has been amended to provide active steps such as applying radiation to a detector comprising and measuring luminescence from the detector as a measure of the presence of neutrons in the radiation.

Finally with respect to Claims 21-30 and particularly the general formula provided at page 8482. The Examiner has acknowledged that van Loef et al does not explicitly describe the claimed materials but takes the position that the general guidance is provided by van Loef et al and that one would have made the necessary modifications to derive the materials in Claims 21-30 with an expectation of successfully obtaining scintillating materials useful for at least the purposes described in the van Loef et al publication.

Regarding claim 21, it cannot derive obviously from van Loef because van Loef teaches only Cs₂Li... compositions and claimed here is Rb₂Li... compositions.

Regarding claim 22, it cannot derive obviously from van Loef because van Loef teaches only compositions where X=Cl or BR, and claimed here X=I.

In view of the distinctions noted above, it is requested that the rejections based on the van Loef publication be withdrawn.

A Notice of Allowance is kindly requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Norman F. Oblon



Daniel J. Pereira
Registration No. 45,518

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413-2220
(OSMMN 06/04)